

QUERY CONTROL FORM		RTIS USE ONLY	
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SPECIFICATION	MESSAGE
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CLAIMS	
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RESPONSE	

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1 the softening temperature and arranging the body into the desired geometry. For
2 example, long extruded rods can be advantageously bent into coils or similar shapes.
3 Secondary thermoplastic forming of a co-extruded component in the green condition
4 enables these objects to be twisted and bent and formed into coils, spirals, or similar
5 structures commonly used to package lengths of tubular objects in compact spaces, as
6 with trumpets, intestines, and tubular reactors. Incorporating tubular heat exchanger
7 design features with the secondarily formed co-extruded tubes is particularly
8 advantageous for the thermal management of hydrocarbon-fueled solid oxide fuel cells,
9 which can involve endothermic reforming reactions, by supplying heat recovered from
10 the exhaust streams or exothermic regions to the endothermic reforming regions.

11

12 The tubular designs illustrated by Fig. 3 could be joined with other tubular
13 structures after the MFCX process, using the warm-forming ability of the thermoplastic
14 in the "green" state to bring together a plurality of tubes and join them by warm welding
15 or solvent bonding to that the create, after firing, a unitized multi-tubule object. Fig. 3
16 illustrates a plurality of thermoplastically co-extruded tubes joined on the left and the
17 right in a common manifold with an alignment ring to guide the several sections and
18 form a tubular bundle. Fig. 4 shows secondary structure for a manifold, which could be
19 used for adjacent fuel reforming or as a heat exchanger. The tube array could usefully
20 be contained in a suitable envelop, illustrated by the outer gray circle in Fig. 4. The
21 envelop can form an encapsulating material which is gas permeable and electrically
22 insulating, such as various foams and felts. Advantageously the mass of the assembly
23 is low, so there is little inertia (for mechanical shock) and little thermal mass.